

ABSTRACT

The objective of present invention is introduce machining tools and to manufacturing method to make extremely thin electronic material such as a piezoelectric element as a quartz oscillator, silicone or Gallium Arsenic and so on as well as a optical lens, which were difficult to be machined by conventional techniques.

The manufacturing process of piezoelectric element and silicone and so forth is featuring to make plural concave parts on the surface of the piezoelectric blank (80 μm thick and 2 inch diameter for example), which is machined by lapping tools as dual faced, one faced or others, is lapped by using the conventional chemical etching method as the first step, and to make thinner typically 12 μm (to 62 μm for example) on another surface of the blank by the reactive ion etching (RIE) as the second step. Finally both surfaces are lapped by the dual-face mechanical lapping machine, one face machine or float polishing machine in order not only to eliminate the rough ion-damaged layer in a few μm thickness (for example convex and concave surface exists in thickness from 0.2 μm to 3 μm due to RIE) after the chemical RIE process, dry etching as ion milling and plasma etching or wet etching, but also to form the oscillating part in a convex lens shape at the opposite surface of concave part.